Marine Physical Laboratory

Dynamics of Acoustic Array Cables

William S. Hodgkiss

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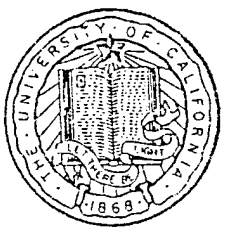

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Scripps Institution of Oceanography
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The objective of this project was to prepare a report documenting the results from cable dynamic studies that were performed in support of the design of acoustic arrays for the High Gain Program. The studies were confined to two specific areas: 1) The dynamic response of cables under low tension; and 2) The prediction of vortex-induced vibrations of long cables in a shear current. Results from studies of cable dynamics are presented in a technical report prepared by Woods Hole Oceanographic Institution.

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Final Report to the
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Abstract

Dynamics of low-tension cables are important for understanding the response of arrays that lay-over in a current at 45°. There are great benefits in making high-gain arrays that are lightweight and expendable so that they can be rapidly deployed quickly anywhere in the world. The cables of these arrays will have to be of small diameter to facilitate handling and deployment and be under low tension in order to withstand environmental forcing due to wind, waves, and currents. To date, there has not been a comprehensive way of analyzing the dynamics of cables under low tension, the missing ingredients being the proper modeling of bending stiffness and extensibility.

Research Objective

The objective of this project was to prepare a report documenting the results from cable dynamic studies that were performed in support of the design of acoustic arrays for the High Gain Program. The studies were confined to two specific areas: 1) The dynamic response of cables under low tension; and 2) The prediction of vortex-induced vibrations of long cables in a shear current.

Research Summary

Results from studies of cable dynamics are presented in the following technical report prepared by Woods Hole Oceanographic Institution.

Publications

1. Grosenbaugh, Mark. A. "Low Tension Cable Dynamics and Prediction of Vortex Induced Vibrations of Acoustic Array Cables. (Woods Hole Oceanographic Institution, Woods Hols, MA. December 1993). 130 pgs.

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Chief of Naval Research (3)
Department of the Navy
Ballston Tower One
800 North Quincy Street
Arlington, VA 22217-5660
Atten:Richard D. Doolittle
Code 4515

Administrative Grants Officer (1)
Office of Naval Research - San Diego
Regional Office
Resident Representative
University of California, San Diego, 0234
4520 Executive Drive, Suite 300
San Diego, CA 92121-3019

Commanding Officer (1)
Naval Research Laboratory
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Defense Technical Information Center (4)
Building 5, Cameron Station
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